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(54) **HUMAN EMBRYONIC STEM CELL LINE PREPARED BY NUCLEAR TRANSFER OF A HUMAN SOMATIC CELL INTO AN ENUCLEATED HUMAN OOCYTE**

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(30) **Foreign Application Priority Data**

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(52) **U.S. Cl.**

USPC **435/366**; 435/373; 435/377; 435/384; 435/395; 800/24

(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

FOREIGN PATENT DOCUMENTS

CN	1429267 A	7/2003
RU	2 216 591 C2	1/2003
WO	WO 86/07377	12/1986
WO	WO-02/086073	10/2002

OTHER PUBLICATIONS

Mitalipov et al. Rhesus Monkey Embryos Produced by Nuclear Transfer from Embryonic Blastomeres or Somatic Cells. Biol. Reproduct. 2002, vol. 66, pp. 1367-1373.*

Byrne et al. Producing Primate Embryonic Stem Cells by Somatic Cell Nuclear Transfer. Nature. Nov. 22, 2007, pp. 497-502.*

Pera et al. Human Embryonic Stem Cells. J. Cell Science. 2000, vol. 113, pp. 5-10.*

Fox, B. Disgraced Cloning Pioneer Could Keep His Patents. The New Scientist, Jan. 18, 2006, pp. 1-3, http://www.newscientist.com/article/dn8601-disgraced-cloning-pioneer-could-keep-his-paten.*

Cibelli et al. Somatic Cell Nuclear Transfer in Humans: Pronuclear and Early Embryonic Development. Journal Regenerative Med., 2001, vol. 2, pp. 25-31.*

Stojkovic et al. Derivation of a Human Blastocyst After Heterologous Nuclear Trnasfer to Donated Oocytes. Reproductive BioMedicine Online. 2005, vol. 11, pp. 226-231.*

Stojkovic et al. Derivation, growth and applications of human embryonic stem cells. Reproduction (2004) 128 259-267.*

Hwang et al Evidence of a Pluripotent Human Embryonic Stem Cell Line Derived from a Cloned Blastocyst. Science, vol. 303. pp. 1669-1674.*

Gardner et al. Culture of viable human blastocysts in defined sequential serum-free media. Human Reproduction, 1998, vol. 13 Supplement 3, pp. 148-159.*

Gardner and Lane. Towards a single embryo transfer. Reproductive BioMedicine Online, 2003, vol. 6, pp. 470-481 www.rbmonline.com/Article/786.*

Tobin and Kim. Confirmation of Parthenogenetic Identity by Recombination Signature in Human Embryonic Stem Cells. Stem Cells and Development, 2013, vol. 22, pp. 1016-1017.*

Jung et al., "Epigenetic signatures of somatic cell nuclear transfer-derived embryonic stem cells", International Journal of Molecular Medicine, 28, 2011, pp. 697-704.

Kim et al., "Recombination Signatures Distinguish Embryonic Stem Cells Derived by Parthenogenesis and Somatic Cell Nuclear Transfer", Cell Stem Cell, 1, Sep. 2007, pp. 346-352.

Bongso et al., "Isolation and culture of inner cell mass cells from human blastocysts," *Human Reproduction*, Nov. 9; vol. 11:2110-2117 (1994).

Chen et al., "Embryonic stem cells generated by nuclear transfer of human somatic nuclei into rabbit oocytes," *Cell Research*, Aug. 2003, vol. 13(4), pp. 251-263.

Chinese Office Action (Feb. 18, 2008) from co-pending Chinese Appln. No. 200480039480.7.

Cibelli et al., "Somatic Cell Nuclear Transfer in Humans: Pronuclear and Early Embryonic Development," *J. of Regenerative Medicine*, Nov. 26; vol. 2:25-31 (2001).

Cibelli et al., "Transgenic bovine chimeric offspring produced from somatic cell-derived stem-like cells," *Nat. Biotechnol.*, July; vol. 16:642-646 (1998).

(Continued)

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(57) **ABSTRACT**

An embryonic stem cell line derived from a nucleus-transferred oocyte prepared by transferring a nucleus of a human somatic cell into an enucleated human oocyte may differentiate into various desired cell types.

7 Claims, 11 Drawing Sheets
(7 of 11 Drawing Sheet(s) Filed in Color)